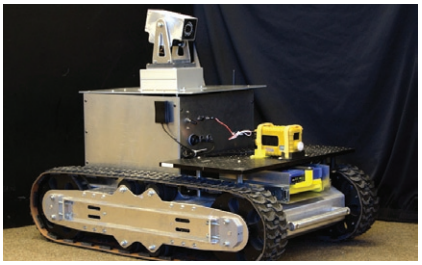
National Aeronautics and Space Administration

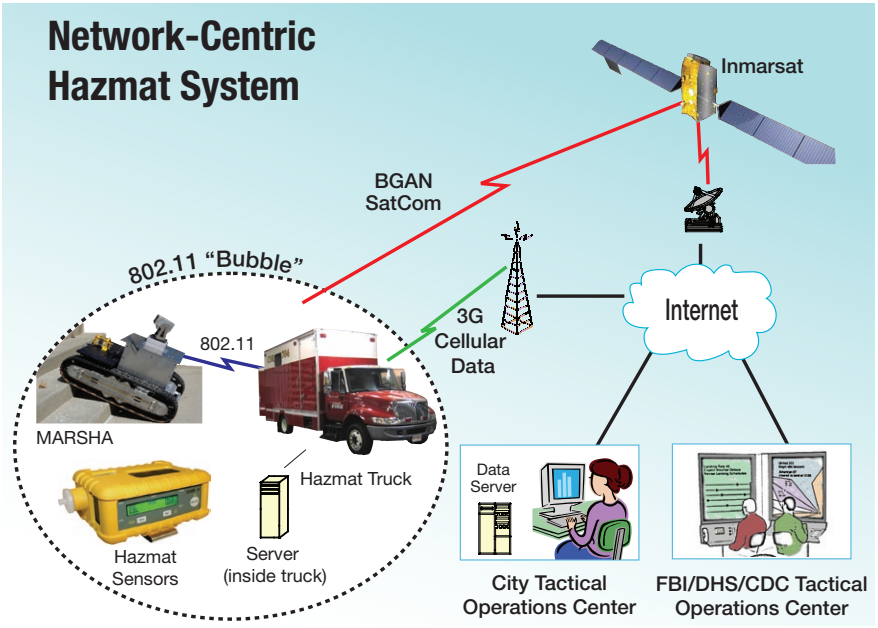
technology opportunity

# Mobile Sensing Platform Surveys Hazardous Scenes

***Supporting first responders with a versatile robotic platform that uses off-the-shelf parts for cost-effectiveness***



www.grc.nasa.gov/www/OptInstr/videos.html




Engineers at NASA's Glenn Research Center have developed an affordable mobile sensing platform that operates in many different hazardous environments to provide first responders with data collection and analysis tools to assess and minimize risks. Equipped with adaptable plug-and-play components, NASA's rugged yet agile Mobile And Remote Sensing Hazmat Activity (MARSHA) innovation can incorporate live video, audio, and/or a suite of sensor packages. Through wireless communication, experts not at the scene can access data and offer guidance. Designed with direct input from first responders, this innovation combines NASA-developed electronics, communications configurations, and controls and data handling software with commercial off-the-shelf components. The result is a user-friendly, quickly-configurable robotic platform that gathers crucial information in dangerous situations without putting team members at risk.

**www.nasa.gov**

## Benefits

- **Safety**: Provides initial, remote surveillance of a potentially unsafe area, precluding the necessity for human presence entirely or until the safety level of a situation can be determined
- **Networked**: Supplies near-real-time remote data access to experts
- **Affordable**: Leverages commercial off-the-shelf components from a range of manufacturers, making it disposable if a mission requires it
- **Versatile**: Supports multiple sensors that are interchangeable on site as mission needs are determined and/or change
- **Simple**: Offers a gaming-style controller that is easy to operate and requires minimal training

## Applications

- Fire and toxic and explosive hazards
- Industrial accidents (evaluating chemical spills and gas leaks)
- Mining accidents (detecting dangerous gasses)
- Bomb detection

***For use by:***

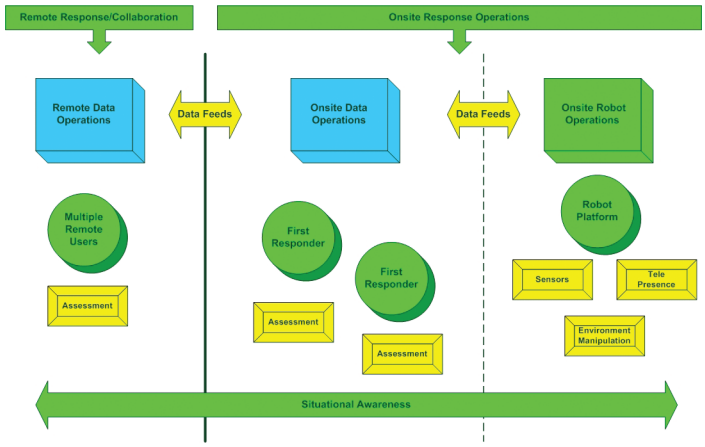
- HAZMAT teams
- Bomb squads
- Special weapons and tactics (SWAT) teams
- Fire departments
- Emergency medical services
- Department of Homeland Security
- Transportation Safety Administration
- Maritime Port Authorities

## Technology Details

### *How It Works*

The innovation consists of an integrated robotic transport platform, a suite of sensors, live video, local wireless communication to the base station, and wireless data communication from the base station to multiple remote locations for data evaluation. It maneuvers well in a variety of conditions—inclement weather, reduced visibility, difficult terrain—and can climb and descend stairs, board vehicles, handle night and day operations, and operate in confined spaces. The transport platform includes the drive system, suspension, and chassis, as well as the framework for holding components, including video and infrared cameras, audio microphones, sensors, chemical "sniffers," communication gear, and computer hardware, all of which are quickly interchangeable on site as mission needs are determined and/or change.

The innovation provides real-time, secure, wireless long-distance, platform-to-base communications with a rack-mounted server providing data connectivity to instruments. Since the system operates in remote as well as urban/suburban areas, both 802.11 (WiFI, wireless networking) and 3G (wireless cellular broadband) communications technologies are used. The robot platform transmits information to the local, onsite server and is controlled via 802.11, and 3G communications are used to transfer information to a central internet-available server for remote data presentation and viewing.




### *Why It Is Better*

NASA's design approach allows first responders to assemble the appropriate sensor, video, and communication components necessary for each mission. This contrasts favorably with current robotic units that are generally only interchangeable within product lines, and tend to be more expensive. Another advantage over current robots is that sensor information can be transmitted as data files from the platform to several agencies for evaluation. All files are maintained on the mobile platform's server, with a mirror image maintained on a central server. Remotely located experts can access data from the central server while first responders continue to investigate the scene. The cost-efficient design, with its plug-and-play framework, places this platform within financial reach of federal, state, and local security groups.

## Licensing and Partnering Opportunities

Glenn's Technology Transfer and Partnership Office seeks to transfer technology into and out of NASA to benefit the space program and U.S. industry. NASA invites companies to inquire about partnering possibilities for this technology.

## For More Information

For more information about this and other technology licensing opportunities, please visit:

**Technology Transfer and Partnership Office**
**NASA's Glenn Research Center**
**E-mail: ttp@grc.nasa.gov**
**Phone: 216–433–3484**
**http://technology.grc.nasa.gov/**